

Remarks

Claims 1-8 are pending in the application. Claims 1-8 are rejected. Claims 1 and 8 are amended. No new subject matter is added. All rejections are respectfully traversed.

Claims 1, 4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchi et al., U.S. Patent No. 6,542,556 (Kuchi) in view of Walton et al., U.S. Patent Application Publication No. 2003/0235147 (Walton).

Regarding claims 1 and 8, the combination of Kuchi and Walton does not teach the claimed selecting, according to channel conditions of the multiple-input / multiple-output wireless communications system, L subgroups of the M groups of antennas, where $L < M$. In response to Applicants' arguments, the Examiner states the following:

Kuchi discloses transmitting input symbol stream using a first set of antennas and a second set of antennas. Therefore, Kuchi discloses the limitation "method for transmitting an input stream of symbols in a wireless communications system including M subgroups of transmitting antennas". Kuchi discloses selecting a first set antennas to transmit an input symbol stream, then select a second set of antenna to transmit an offset of input symbol stream. Therefore, Kuchi discloses the limitation "selecting L subgroups of the M subgroups of antennas, where $L < M$ ".

First, selecting *two* sets of antennas from *two* sets of antennas does not, and can never, teach the claimed selecting of L subgroups of the M subgroups of antennas, **where $L < M$** . As was pointed out in the Applicants' response to the previous Non-

Final Office Action, if Kuchi, as admitted by the Examiner, does not decrease the number of transmitting antennas, then Kuchi does select subgroups of the available subgroups of antennas.

Second, and as was also noted in the previous response, Kuchi does not disclose or even suggest the possibility of not using any of the subgroups. The goal of the Kuchi invention is to utilize *all* available antennas. Clearly, it would be counterintuitive for Kuchi to select a subgroup of available antennas, as Kuchi's interest lies in adding antennas to increase transmit diversity, not in removing antennas.

Finally, neither Kuchi nor Walton teach selecting subgroups of antennas according to channel conditions of the multiple-input / multiple-output wireless communications system. Neither system measures channel conditions of the MIMO system. Therefore, the combination of Kuchi and Walton cannot teach selecting subgroups of antennas according to channel conditions.

As Walton is similarly only directed toward increasing transmit diversity and does not suggest selecting subgroups of antennas, the combination of Kuchi and Walton cannot teach the claimed selecting, according to channel conditions of the multiple-input / multiple-output wireless communications system, L subgroups of the M groups of antennas, where $L < M$.

In addition, the combination of Kuchi and Walton does not teach the claimed transmitting the set of output streams using the L subgroups of antennas. As was stated above, neither Kuchi nor Walton teach reducing the total number of

transmitting antennas from the number of available antennas. The claimed invention transmits the set of output streams on L subgroups of antennas, where $L < M$. That is, the claimed invention transmits the set of output streams on a number of antennas, where the total number of transmitting antennas is less than the total number of available antennas.

As the combination of Kuchi and Walton fail to teach the claimed selecting of and transmitting on L subgroups of antennas, where $L < M$, the combination cannot make the claimed invention obvious.

Regarding claim 4, claimed is where the adaptive modulation and coding depends on the number L of the substreams. As shown above Kuchi as modified by Walton does not teach selecting L subgroups of antennas. Kuchi as modified by Walton only teaches coding based on the total number of available transmitting antennas, which is not the same as the claimed adaptive modulation and coding depending on the number L of the substreams, *i.e.*, adaptive modulation and coding based on the smaller number of substreams sent to the selected L subgroups of antennas. Therefore, the combination of Kuchi and Walton cannot teach the claimed adaptive modulation and coding depending on the number L of the substreams.

The above arguments for claim 4 hold true for claims 6 and 7 as well. As the combination of Kuchi and Walton cannot teach the claimed adaptive modulation and coding of the L substreams or the claimed space-time transmit diversity encoding of each of the L coded substreams into a set of output streams, the cited references cannot teach the claimed further modifications included in claims 6 and 7.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchi in view of Walton, and further in view of Naden et al., U.S. Patent No. 7,184,703 (Naden).

Regarding claim 2, claimed is feeding back, from a receiver, channel conditions and selecting the L substreams to be produced by the demultiplexing according to the channel conditions. Regarding claim 3, claimed is the method of claim 2 where the channel conditions measure a signal to interference plus noise ratio of the output streams received in the receiver. Naden is silent on selecting antennas. Therefore, the combination of Kuchi, Walton and Naden cannot teach the claimed selecting of L subgroups of antennas. As the combination of references cannot teach the claimed selecting, then the combination cannot make the invention obvious.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchi in view of Walton, and further in view of Kim, U.S. Patent Application Publication No. 2003/0103474 (Kim).

Regarding claim 5, claimed is where L is zero to increase an overall capacity of the system including a plurality of receivers. The Examiner states that Kuchi, as modified by Walton and Kim, discloses “decreasing the number of antenna [sic] to increase system efficiency.” This is not what is claimed. Claim 5 explicitly states “where L is zero to increase an overall capacity of the system including a plurality of receivers.” This is not a “reduction” of the number of antennas. This is where, in order to increase overall capacity of the system, the number of transmitting

antennas is **zero**. None of the cited references describe not transmitting on any antennas to increase system capacity; all of the systems described transmit on at least one antenna. The combination of Kuch, Walton and Kim cannot make the claimed invention obvious.

It is believed that this application is now in condition for allowance. A notice to this effect is respectfully requested. Should further questions arise concerning this application, the Examiner is invited to call Applicants' attorney at the number listed below. Please charge any shortage in fees due in connection with the filing of this paper to Deposit Account 50-0749.

Respectfully submitted,
Mitsubishi Electric Research Laboratories, Inc.

By _____
/Clifton D. Mueller/

Clifton D. Mueller
Attorney for the Assignee
Reg. No. 57,836

201 Broadway, 8th Floor
Cambridge, MA 02139
Telephone: (617) 621-7517
Customer No. 022199